

<b>Notice of Allowability</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	09/677,073	TEMKIN ET AL.	
	<b>Examiner</b>	<b>Art Unit</b>	
	Thomas K Pham	2121	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--**

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to amendment filed on 070/7/2004.
2. ☒ The allowed claim(s) is/are 1,2,4-7,9 and 10.
3. ☐ The drawings filed on \_\_\_\_\_ are accepted by the Examiner.
4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
  - a) ☐ All    b) ☐ Some\*    c) ☐ None    of the:
    1. ☐ Certified copies of the priority documents have been received.
    2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
    3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

\* Certified copies not received: \_\_\_\_\_.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

**THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.**

5. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
6. ☒ CORRECTED DRAWINGS ( as "replacement sheets") must be submitted.
  - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review ( PTO-948) attached
    - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date \_\_\_\_\_.
  - (b) ☒ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date 20040924.

**Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).**
7. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

**Attachment(s)**

- |   |  |
|---|--|
| 1. <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 5. <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)            |
| 2. <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                | 6. <input type="checkbox"/> Interview Summary (PTO-413),<br>Paper No./Mail Date _____. |
| 3. <input type="checkbox"/> Information Disclosure Statements (PTO-1449 or PTO/SB/08),<br>Paper No./Mail Date _____ | 7. <input checked="" type="checkbox"/> Examiner's Amendment/Comment                    |
| 4. <input type="checkbox"/> Examiner's Comment Regarding Requirement for Deposit<br>of Biological Material          | 8. <input checked="" type="checkbox"/> Examiner's Statement of Reasons for Allowance   |
|   | 9. <input type="checkbox"/> Other _____.   |

### EXAMINER'S AMENDMENT

1. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Mr. John A. Hamilton on September 23, 2004.

The application has been amended as follows:

Claim 8: delete claim 8.

Claim 6: please replace all prior version of claim 6 in the application with this amended claim:

6. (currently amended) An apparatus for haptic rendering of three-dimensional soft bodied objects for virtual interactions comprising in combination:

- means for forming a three dimensional occupancy map of voxels, forming the surface and bound the object;

- means for forming a multi-dimensional coordinate system for each point, the coordinate system defining a vertex center;

- means for defining minimum and maximums distances of one voxel to all its neighboring voxels (occupied neighbor points);

- means for defining multi-dimensional maximum offsets that an occupied point can maintain relative to its center;

- means for detecting when the minimums or maximums of distance and/or offsets are violated, and in response thereto

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means for moving the points in violation to locations relative to the neighboring occupied points and the points' centers that satisfy the minimum and maximum for distance and offsets; and

means for determining from the relative moving of the points and the offsets from the center for each point the direction and size of the force of the colliding bodies, and for delivering that force in size and direction via a haptic device; and

wherein the detecting means and moving means are capable of repeating the detecting and moving steps for the entire occupancy map until there are no violations.

#### **EXAMINER'S COMMENT**

##### ***Drawings***

6. New corrected drawings in compliance with 37 CFR 1.121(d) are required in this application because the drawings submitted on 09/29/2000 are **informal**. Applicant is advised to employ the services of a competent patent draftsman outside the Office, as the U.S. Patent and Trademark Office no longer prepares new drawings. The corrected drawings are required in reply to the Office action to avoid abandonment of the application. The requirement for corrected drawings will not be held in abeyance.

***Reasons for Allowance***

2. Claims 1-2, 4-7 and 9-10 are allowed.
3. The following is an examiner's statement of reasons for allowance:

While Avila discloses a computer modeling and visualization system employs both 3D visual modeling and force feedback through haptic device. The haptic device(s) is monitored to determine its location and a normal force to an isosurface to create the illusion of physical touching the model.

Stewart (newly cited reference) teaches a system for manipulating a three-dimensional object utilizing a force feedback interface includes applying a force to the force feedback interface based on the gravitational spheres.

And Shih (newly cited reference) teaches a computer modeling application to provide a haptic feedback approach that aids the user of the system in evaluating the whole object including useful interactive force feedback.

Neither of these references taken either alone or in combination discloses a method and device for haptic rendering of three-dimensional soft bodied objects for virtual interactions having all the claimed features of applicant's instant invention, specifically including: "moving the points in violation to locations relative to the neighboring occupied points and the points' centers that satisfy the minimum and maximum for distance and offsets; and determining from the relative moving of the points and the offsets from the center for each point the direction and size of the force of the colliding bodies, and for delivering that force in size and direction via a haptic device". Also, there is no motivation to combine the Avila reference with the Stewart or

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Shih reference to meet these limitations. It is for these reasons that applicant's invention defines over the prior art of record.

The phrase in parenthesis in claim 6, line 8 is considered to be a limitation on the claims since it is relied upon by applicant at lines 13-15 and this phrase is considered as part of the reasons for allowance.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

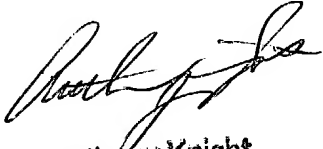
Any inquiry concerning this communication or earlier communications from the examiner should be directed to examiner *Thomas Pham*; whose telephone number is (703) 305-7587 or the new number (571) 272-3689 beginning around mid. October 2004, Monday to Friday from 8:00 AM - 5:00 PM EST or contact Supervisor *Mr. Anthony Knight* at (703) 308-3179 (or 571 272-3687 starting around mid. Oct. 2004).

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

**Thomas Pham**  
*Patent Examiner*

TP

September 24, 2004

  
**Anthony Knight**  
**Supervisory Patent Examiner**  
**Group 3600**